Consolidation of MOBAGS: The Quest for Efficiency in Logistics Operations

GRADUATE RESEARCH PAPER

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ABSTRACT

The Air Force has over 300,000 mobility bags designed specifically to hold Chemical Warfare Defense Equipment, commonly known as "C-bags," thousands of which are deployed with Airmen at any given time. In 2004 an initiative by CENTAF (CentCOM Air Force; now known as AFCENT, Air Forces Central Command) to cut transportation costs resulted in the stand-up of three regional centralized distribution facilities throughout the Middle East. The resultant savings of $17 million in the first year has spurred interest in consolidating and centrally distributing other mobility bags in the Continental United States (CONUS).

This paper uses transportation costs to determine whether it makes sense to centrally locate the C-bags at one specific location, the Consolidated Mobility Bag Coordination Center (CMBCC) at Wright-Patterson AFB, Ohio, and distribute the bags from there when needed for deployments. Using cost data concerning the shipment of bags from the CMBCC to either a deployer's home station or directly to the deployed location and comparing that data to the excess baggage charges currently imposed by commercial airlines, the answer appears to be negative – that it is *not* more efficient, with regard to transportation costs, to distribute bags from a central facility. There are, however, many other factors to consider such as personnel manning, replenishment costs for expired items, and the proper determination of C-bag requirements, before a decision should be made.

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I would like to thank Mr. Cory LaGrow from Air Mobility Command for his enduring friendship and wisdom over the past 4 years.

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INTRODUCTION

BACKGROUND

Consolidation of assets for the purpose of saving costs and achieving efficiencies has been considered by numerous functional areas within the Air Force, to include a recent exploration of the feasibility of consolidation of Security Forces war reserve materiel (WRM) assets with the assistance of the Air Force Institute of Technology (AFIT). With all of the attention focused lately on recapitalization efforts and ways to do more with less (a recurring theme since the end of the Cold War), consolidation is a very relevant topic which, if wisely implemented, can achieve almost immediate savings while causing minimal impact to daily Air Force operations.

There is significant potential for the Air Force to save money by consolidating mobility bags (MOBAGS) and, in particular, the standard Chemical or C-Bag. This project will examine whether the Air Force, if it hypothetically stored its C-Bag assets in one location, could gain efficiencies in transportation costs by shipping those bags out to bases when needed by that base's deploying members, or directly to the deployed location, rather than those bases maintaining the bags themselves.

To make a sound judgment, first some background regarding C-Bag composition, the framework for consolidation, and current consolidation practices will be provided. Then information regarding transportation costs to some representative bases from a proposed consolidation location will be examined to determine if it is more efficient for the Air Force to distribute its C-Bag resources from one consolidated location.

PROBLEM STATEMENT

Today the Air Force stores mobility bag assets at over 513 locations, each of which is responsible for the manpower and performance of duties centering around MOBAG management, such as purchasing replenishments for their shelf-life items, as well as providing single-source maintenance, inspection, and accounting for those items. If those bags could be transported from a single CONUS-based consolidation point to the deploying members' bases on a just-in-time schedule, among many of the benefits realized by consolidation could be a freeing up of heavily tasked Supply personnel at the bases to perform other functions within their units, as well as greater accountability and maintainability of the assets.

There already exists in the Air Force today an entity called the Consolidated Mobility Bag Control Center (CMBCC). Located at Wright-Patterson AFB, Ohio, the CMBCC is responsible for maintaining the 3rd and 4th sets of Joint Service Lightweight Integrated Technology Suit (JSLIST)/chemical overgarments and for shipping those to locations when and if they are needed due to utilization of the 1st and 2nd sets which deployed members receive in their C-Bags. The CMBCC also keeps track of issues regarding C-Bag items such as shelf-life extensions or equipment recalls and coordinates that information with MAJCOMs as well as the Expeditionary Theater Distribution Centers (ETDC) located overseas.

Because of the significant cost savings that can be achieved through consolidation and centralized distribution, as has been proven in commercial entities, if the CMBCC were utilized as a distribution center for not only the 3rd and 4th JSLIST suits, but for the

entire C-Bag and its contents, it is possible that the Air Force could achieve considerable cost savings. Therein lays the basis for this research project.

HYPOTHESIS & RESEARCH QUESTIONS

The hypothesis for this project is that *with regard to transportation costs, it is more efficient to store/maintain/issue C-Bags at/from the CMBCC and transport them to bases or directly to deployed locations when needed than it is to store/maintain/issue those bags at/from the home bases themselves*. Based upon analysis of the data collected, this hypothesis will either be accepted, meaning that the data demonstrates that it is indeed more efficient to transport bags from the central location, or the hypothesis will rejected if the data is inconclusive.

The questions for which answers will be sought include which is the least expensive method to deploy C-bags? What is the most efficient mode of shipment for C-bags, air or surface? Do there appear to be economies of scale that can be achieved though larger shipments of bags?

METHODOLOGY

The methodology utilized in this project is primarily that of a quantitative case study of transportation costs. Some background information will be provided though a literature review and examination of current Air Force practices. The methodology will be further explored in Part III of this paper.

Part II

LITERATURE REVIEW

THE CWDE MOBAG DEFINED

The Chemical Warfare Defense Equipment bag is comprised of items that provide protection from nuclear, biological, or chemical hazards during and following an attack. These items include the JSLIST/Chemical protective groundcrew ensemble as well as the supporting accouterments. Altogether, the bag contains a protective mask, two filter sets/canisters, chemical protective overgarment, two pair of footwear covers or one Green/Black Vinyl Overshoe, two pair of glove sets and two protective hoods, winterization kit (if required), M8 detector paper booklet, M9 detector paper roll, M258A1 or M291 decontamination kit, M295 decontamination kit, web belt, canteen, M1 canteen cap, and helmet (AFI 23-226, Attachment 4).

These bags weigh approximately 30 pounds when packed and are standard issue for members deploying worldwide. Current Air Force practice is to deploy one of these bags with each deploying member when it is specified in the deployment tasking line remarks. The only exception to this rule is for personnel deploying to the Middle East who will travel through Kuwait, Qatar, or Kyrgyzstan. Those personnel do not have to take a bag with them as they will be issued a C-bag at an Expeditionary Theater Distribution Center (ETDC) which will be discussed later in this paper.

FRAMEWORK FOR CONSOLIDATION

According to Mr. Cory LaGrow, former Command Mobility Bag Manager for Air Mobility Command, the cost to procure one of these bags initially is approximately $1,000. Currently the Air Force has over 300,000 of these bags, most of which are held in inventory at over 513 locations (this number counts Active Duty, Reserve, and Guard bases). At any given time, only a fraction of those bags are deployed. As a result, many of the items in the bag (such as the detector paper and mask filters) have shelf lives that expire without ever having been used. During a telephone interview, Mr. Dave Dahl from the CMBCC stated that the Air Force spends approximately $100 on each bag, each year, to replenish expired shelf life items. While at first glance $100 does not appear to be an extraordinary amount of money, when multiplied across the full complement of 300,000+ bags, the sum of $3,000,000 becomes more noteworthy.

There is some question as to whether the number of 300,000 C-Bags is a valid requirement or if it is too large. During the Cold War when the threat of a Soviet nuclear or chemical attack was much greater, CONUS bases issued bags to individuals to maintain in their offices or workplaces. However, the landscape of the threat environment has changed such that, with the exception of personnel deployed overseas in higher threat areas (such as Korea or in the Middle East), all bags are now maintained in Supply warehouses. While the exploration of what the correct number of bags required is beyond the scope of this project, it is worth noting that all of the MOBAG inventory sitting unused on shelves around the world presents a significant opportunity for cost savings through consolidation.

The CMBCC at Wright-Patterson AFB provides oversight and management of the MOBAG process while giving input to Headquarters Air Force (HAF) personnel on policy and guidance. By regulation, the mission of the CMBCC is to "centrally store and manage chemical warfare defense equipment (CWDE) mobility bags consisting of the third and fourth set of IPE (minus gas mask/web belt/canteen/M-1 canteen cap/helmet) for all CONUS-wide requirements. The first and second set of groundcrew IPE (to complete the total requirement of four per authorized mobility position number) will remain at each CONUS AF base" (AFI 23-226, Paragraph 1.1.3). Because the CMBCC already has storage capability, this paper uses it as the theoretical "hub" for all CONUS-based bag storage.

A final note on consolidation at the CMBCC needs to be made regarding numbers of bags. Because at any given time there are upwards of 20,000 Air Force personnel deployed, and the vast majority of those are to the USCENTCOM AOR, which already has consolidated bag distribution (discussed in the next section), there is likely no realistic need for the Air Force to maintain 300,000 bags in the CONUS. In fact, the number could be radically smaller, such as 50,000, for a safety stock of bags in case conflict arises in another part of the world. Again, the determination of the appropriate number is beyond the scope of this project; however it is easy to see that, absent the threat of attacks upon CONUS bases, it makes little sense to maintain so much inventory (with the associated overhead of personnel, warehouse space, replacement costs of shelf-life items) at dispersed bases, when so many efficiencies could be achieved by storing them centrally. Arguably many factors play into the calculation of whether or not true efficiencies can be gained through centralization of an asset such as the C-Bags, and that

is why this paper focuses on only one factor – the cost of transporting a bag from the CMBCC to where it would be needed for the deploying member.

THE ETDC CONCEPT IN PRACTICE – CONSOLIDATION IN THE AOR

The Air Force is already successfully employing a centralized distribution model for protective equipment in the Middle East. Springing from a concern raised by the USCENTAF/CC, in 2004 the USCENTAF/A4 launched a study of transportation costs deploying to the USCENTCOM AOR every rotation. The study found that in FY04, transportation costs for baggage reached in excess of $51 million. This cost was largely driven by the fact that the MOBAGS (including A-, B-, and C-bags) were considered by the airlines to be excess baggage above and beyond deployers' authorized two personal bags, and, as such, reduced the Allowable Cabin Load for passengers (the amount of passengers that can be carried when factored with aircraft performance parameters including fuel, range, and cargo). The result was a need for more airframes with already costly seats (averaging $1,600 per seat), thus driving up the overall cost of transportation.

Because the preponderance of deploying personnel transited through Qatar, Kyrgyzstan, or Kuwait, ETDCs were established in those countries and personnel deployed to those locations were ordered to leave their bags in place upon redeployment to home station. When the next rotation of personnel deployed through the ETDC bases, they picked up the excess bags in theater rather than carrying them from home station and across the Atlantic Ocean. The resultant cost savings was a staggering $17 million in the first year alone, which included savings from fuel, excess baggage charges, and the intangible benefit of convenience to the Airmen who no longer had to drag 4 or more cumbersome bags through airports.

If the ETDC concept can work so effectively in the theater of operations, there is no reason to believe that the centralized storage and distribution concept cannot also work well within the CONUS. However, before a decision of that magnitude can be made, much data and cost analysis must be completed, as well as a risk-reward evaluation. This paper attempts to provide Air Force leadership with one piece of the decision matrix – the transportation costs associated with moving bags from a consolidated location, the CMBCC, to either a deploying member's home station for onward movement as checked baggage, or directly to the deployed location.

Part III

METHODOLOGY

Leedy and Ormrod describe a case study as "a type of qualitative research in which in-depth data are gathered relative to a single individual, program, or event, for the purpose of learning more about an unknown or poorly understood situation" (p. 114). This project uses a more quantitative approach to the case study method of research.

This research paper is focused on a cost-comparison between modes of transportation. As such, it is not extraordinarily complex. Rather, it gathers and presents one set of data (transportation costs) that, although seemingly simplistic, when combined with other information such as the cost of warehousing or the appropriate number of MOBAG assets to maintain, becomes critical to assisting Air Force decision makers in deciding whether or not to consolidate C-Bag assets at the CMBCC.

The C-Bag is the focus of this project for a number of reasons. The A-Bag is considered a general purpose bag and, as is currently designed, is customizable by each home station base and/or squadron for mission-specific needs. The B-Bag is a cold-weather bag, and not all bases maintain the bag unless their deployed mission will expose their members to extremely cold temperatures. All bases, however, currently maintain the C-Bag for which there are standardized requirements as well as shelf-life/expiration concerns.

The data for this project was gathered from multiple sources. Airline baggage data was collected directly from airline websites. Freight transportation costs were gathered with assistance from Mr. Barry Evans of the Outbound Freight Management

office, 20th Logistics Readiness Squadron, Shaw Air Force Base, South Carolina. Much of the additional qualitative research was compiled by the author or with the assistance of the Air Force Expeditionary Center's Research Librarian, Ms. Pamela Bennett Bardot.

Destinations for cargo were selected carefully. The US bases were chosen by selecting locations that represented, geographically, points on the east and west coasts (McGuire AFB in New Jersey, and Travis AFB in California) as well as a centrally located base in the southern tier states (Lackland AFB, in San Antonio, Texas). Overseas destinations were chosen based upon potential for regional flare-ups that might warrant United States' military involvement, as well as being dispersed on three different continents; thus the representative locations were selected to be Djibouti (Africa), Poland (Europe), and Pakistan (Asia).

The size of the deploying "units" was arbitrarily selected because there is no "one size fits all" measurement. Many Air Force personnel deploy as singletons, also referred to as "individual augmentees," thus the cost of moving a single bag at a time was explored. At other times, a larger flight of personnel may deploy as a team. Because the 16 Advanced Study of Air Mobility students travel en masse for all of their courses, 16 became a meaningful and realistic number that could be researched. Finally, there are times when half or all of a unit will deploy at one time; thus the cost of moving 50 bags as a notional unit move was examined.

ASSUMPTIONS/LIMITATIONS

In order to keep the scope of this project narrow, a number of assumptions were made. The first assumption made was that each base will retain a number of chemical

suit ensembles that can be used to size assigned personnel, and that the sizing data will be able to be sent to the CMBCC for bag construction in a just-in-time manner based upon a list of deploying members. The second assumption made was that there will be adequate deployment notification time before the Required Delivery Date (RDD) or date that the person is required to be in place for the tasking, such that on-hand-assets from the base are not required to be sent with the deploying member.

Some of the limitations which this project does not address includes obstacles to implementation and issues beyond the scope of the project. One of the biggest obstacles to implementation of a centralized stocking concept would likely be obtaining the squadron commanders' confidence in the CMBCC's ability to equip their Airmen with correctly sized equipment and to have those bags delivered within an adequate amount of time before deployment or meet their Airmen in a timely manner at the deployed location. Another factor that will not be addressed is the reality that there will always need to be a "safety stock" of MOBAGs maintained at each base to support the rapid deployment of "first responder" personnel, such as Contingency Response Wing members, who must be ready to deploy within windows as short as 12 hours from notification. An issue which is beyond the scope of this project but is worthy of exploration is to determine the actual requirement for MOBAGS – how many are needed of each type based upon OPLAN and contingency support requirements.

This project does not attempt to answer any of these concerns; however the answers to those issues could have significant impact on a real-world implementation of MOBAG consolidation strategies.

Part IV

RESULTS AND ANALYSIS

The data for this study was relatively easy to obtain and examine. First, Mr. Barry Evans from the 20th Logistics Readiness Squadron, Shaw AFB, South Carolina provided the cost data for the shipments, given the weights and destinations. That data was then manipulated within an Excel spreadsheet and formatted such that it was easy to understand visually. Next, excess baggage costs charged by America's "Big Five" airlines to military personnel, which can be found below in Table 1, was obtained from each airline's website.

Airline	**Number of Checked Bags Allowed Free of Charge**	**Weight Limit of Bags**	**Charge for Excess Baggage (each piece)**
American	**2**	**No specification**	**$100**
Continental	**3**	**70 lbs each**	**$100**
Delta (including Northwest)	**3**	**70 lbs each**	**$200**
United	**3**	**70 lbs each**	**$200**
US Airways	**3**	**100 lbs each**	**$100**

Table 1 – Airline Baggage Allowances and Excess Baggage Fees

As can be seen from Table 1, the normal excess baggage fee for the major US carriers is for anywhere from $100 to $200 per bag to be charged. This charge is exclusive of military status, and is applied above and beyond whatever the threshold baggage allowance is for the category of traveler. Thus, a military person traveling on American Airlines with 4 pieces of baggage would be charged $200, since the "free" allowance is for 2 bags, with each additional bag costing $100.

Along with the shipment data, the excess baggage costs were also factored into the spreadsheets which can be found in Appendices A through C. The amounts provided in Appendices B and C, were obtained by dividing the "Total Shipment Cost" (Appendix A) by either the number of bags to arrive at "Cost per Pound" (Appendix B) or by the pounds shipped to arrive at "Cost per Bag" (Appendix C).

For the purposes of this analysis, a hypothetical but realistic example of an Airman deploying with 4 pieces of baggage (2 personal bags, 1 unit-specific A-bag, and 1 C-bag) will be considered. From Table 1, one can see that a fourth piece of excess baggage will almost always equal a $200 charge (with the exception of Continental, but since it is the one-off example, the more expensive charge will be the baseline). Thus, no matter where in the world an Airman is deploying to, the cost to check the fourth bag on his commercial flight will be $200 total, regardless of destination.

Tables 2 through 4 reflect the cost comparison of deploying bags either directly from each CONUS base with the Airman transporting the bag as excess baggage, from the CMBCC to the base (via surface or air) and then the Airman checking it as excess baggage, and finally directly from the CMBCC to the deployed location via surface or air. The calculation of excess baggage fees was simple, multiplying the number of bags

shipped by $200. The other calculations required only minimally more work; either adding the extra transportation cost to the excess baggage fees to determine how much it would cost to send the bags from the CMBCC to the home station for onward movement as excess baggage, or by calculating the charge to ship bags directly to the destination.

		Bags Sourced from:			
		Home Station	CMBCC to Home Station		CMBCC to Deployed
TRAVIS AFB					Location
To Djibouti					
	1 Bag	$200.00	$378.05	Air	$751.58
			$236.75	Surface	$604.72
	16 Bags	$3,200.00	$6,162.08	Air	$8,509.92
			$5,028.16	Surface	$4,921.60
	50 Bags	$10,000.00	$15,853.50	Air	$24,445.00
			$14,668.50	Surface	$14,126.50
To Pakistan					
	1 Bag	$200.00	$378.05	Air	$413.71
			$236.75	Surface	$384.25
	16 Bags	$3,200.00	$6,162.08	Air	$5,166.40
			$5,028.16	Surface	$3,515.36
	50 Bags	$10,000.00	$15,853.50	Air	$14,843.00
			$14,668.50	Surface	$10,090.50
To Poland					
	1 Bag	$200.00	$378.05	Air	$751.58
			$236.75	Surface	$604.72
	16 Bags	$3,200.00	$6,162.08	Air	$8,509.92
			$5,028.16	Surface	$4,921.60
	50 Bags	$10,000.00	$15,853.50	Air	$24,445.00
			$14,668.50	Surface	$14,126.50

Table 2 – Shipment Costs from Travis AFB

		Bags Sourced from:				
		Home Station		CMBCC to Home Station		CMBCC to Deployed
McGuire AFB						Location
To Djibouti						
	1 Bag	$200.00		$344.85	Air	$751.58
				$217.29	Surface	$604.72
	16 Bags	$3,200.00		$4,538.40	Air	$8,509.92
				$3,776.48	Surface	$4,921.60
	50 Bags	$10,000.00		$13,987.50	Air	$24,445.00
				$11,445.00	Surface	$14,126.50
To Pakistan						
	1 Bag	$200.00		$344.85	Air	$413.71
				$217.29	Surface	$384.25
	16 Bags	$3,200.00		$4,538.40	Air	$5,166.40
				$3,776.48	Surface	$3,515.36
	50 Bags	$10,000.00		$13,987.50	Air	$14,843.00
				$11,445.00	Surface	$10,090.50
To Poland						
	1 Bag	$200.00		$344.85	Air	$751.58
				$217.29	Surface	$604.72
	16 Bags	$3,200.00		$4,538.40	Air	$8,509.92
				$3,776.48	Surface	$4,921.60
	50 Bags	$10,000.00		$13,987.50	Air	$24,445.00
				$11,445.00	Surface	$14,126.50

Table 3 – Shipment Costs from McGuire AFB

		Bags Sourced from:				
		Home Station	CMBCC to Home Station		CMBCC to Deployed
Lackland AFB					Location
To Djibouti					
	1 Bag	$200.00	$364.70	Air	$751.58
			$226.27	Surface	$604.72
	16 Bags	$3,200.00	$5,616.48	Air	$8,509.92
			$4,245.92	Surface	$4,921.60
	50 Bags	$10,000.00	$17,405.00	Air	$24,445.00
			$12,865.50	Surface	$14,126.50
To Pakistan					
	1 Bag	$200.00	$364.70	Air	$413.71
			$226.27	Surface	$384.25
	16 Bags	$3,200.00	$5,616.48	Air	$5,166.40
			$4,245.92	Surface	$3,515.36
	50 Bags	$10,000.00	$17,405.00	Air	$14,843.00
			$12,865.50	Surface	$10,090.50
To Poland					
	1 Bag	$200.00	$364.70	Air	$751.58
			$226.27	Surface	$604.72
	16 Bags	$3,200.00	$5,616.48	Air	$8,509.92
			$4,245.92	Surface	$4,921.60
	50 Bags	$10,000.00	$17,405.00	Air	$24,445.00
			$12,865.50	Surface	$14,126.50

Table 4 – Shipment Costs from Lackland AFB

In each and every case studied, shipping the bags from home station with the deploying Airman was less expensive than shipping bags from CMBCC to the home base or from CMBCC directly to the deployed location. The next factor to examine was which mode of shipment was more efficient.

Despite being sent to locations around the globe, the longest transit time for a bag to move through the system was quoted at 10 days. Air shipments within the CONUS were considered "next-day" deliveries. Surface shipments had very respectable delivery times, with the longest being 4 days from the CMBCC to Travis AFB. Within the cost analysis regarding mode of shipment for CMBCC bag origination, the consistent "winner" was surface. The surface costs beat the air costs every time.

The interesting outcome of the study is that the decision to originate a bag from the CMBCC and then send it to either the home station or directly to the deployed location depends solely on the destination of the bag. Sometimes it was cheaper to send it to the home station for onward movement with the Airman as excess baggage, and sometimes it was less expensive to send the bag directly from the CMBCC to the deployed location. There did not appear to be a connection between regions; nor was there a noticeable break point at which shipping larger quantities of bags would result in lower costs. Again, the only definitive results were that sending C-bags from home station as excess baggage was least expensive in every case, and the surface mode of shipment from CMBCC, no matter the destination, was cheapest in every case.

Part V

CONCLUSIONS AND RECOMMENDATIONS

This section addresses the overarching research question posed by the study, provides a summary of research conclusions, and recommends future research considerations for exploration.

OVERARCHING RESEARCH QUESTION

The overarching research objective of this study was to examine the hypothesis that: **With regard to transportation costs, it is more efficient to store/maintain/issue C-Bags at/from the CMBCC and transport them to bases or directly to deployed locations when needed than it is to store/maintain/issue those bags at/from the home bases themselves**.

In order to evaluate this hypothesis, the following specific research questions were evaluated:

1. **Given the data, which appears to be the least expensive method to deploy C-bags? From a home base? Or from the CMBCC?**

A thorough examination of the data reveals that the least expensive method to deploy C-bags is from the home base. Even when traveling as excess baggage, there was never a time when it was cheaper to ship from the CMBCC than to issue bags from home station.

2. **Which is the most efficient mode of shipment for C-bags, air or surface?**

The most efficient mode of shipment is by surface. In all cases, bags could be

shipped from the CMBCC and be delivered to the destination, whether that was at a CONUS base for onward movement as excess baggage, or directly to the overseas destination, within 2 to 10 days for a much greater cost savings than shipping the same bags by air.

3. **Are there efficiencies to be gained through economies of scale when shipping directly from a centralized location?**

While in the commercial sector this is a common justification to centralization, in this study there were no immediately apparent economies of scale to be achieved. The most expensive method was to ship one bag at a time. Beyond that, the size of the shipment did not have a recognizable impact on price differentiation. Perhaps this was because all of the lots were significantly less than truckload size, with the largest shipment weighing only 1,500 pounds.

SUMMARY: RESEARCH CONCLUSIONS AND RECOMMENDATIONS

The data in this study is clear; **with regard to transportation costs alone, it is more efficient to distribute and deploy C-bags from home stations with deployers than it is to ship them from the CMBCC.** The danger, however, is in taking such a small portion of the picture and making a sweeping judgment about CMBCC efficiency or lack thereof. Indeed, there are many other factors which should weigh into the overall decision making process about whether or not to centralize MOBAG distribution at the CMBCC. Very real and sometimes intangible issues such as manning, shelf-life item replenishment, and readiness and responsiveness should also be taken into consideration.

Furthermore, transportation costs are dependent upon a number of factors. Rising fuel costs would result in a price increase across the board, whichever mode of travel has been decided upon. However, airline pricing for excess baggage is much more subject to fluctuation. It only takes one airline to begin discretionary pricing tactics, and before long the rest follow suit. This could have a significant impact on the outcome of this study if it were to be repeated at a later time.

FUTURE RESEARCH CONSIDERATIONS

There are a number of other questions related to MOBAGs and consolidation efforts that warrant further examination. Here are some suggestions for further research projects:

- Determine the "right" number of MOBAGs needed to support the tasked warfighters. In the past, this determination was made by simply examining the maximum number of personnel that could be tasked from one base to support any number of off-the-shelf OPLANs and applying a formula which was dependent upon the scenario. In the current "adaptive planning" scenarios used by the Air Force to conduct operational planning, that number of required MOBAGs is not as clear cut. What is the actual, appropriate requirement to ensure adequate personnel readiness and, yet, minimize the fiscal impact upon the Air Force?

- Examine the cost savings achieved by consolidating MOBAGs at the CMBCC with regard to warehousing. The results of such a study could have a significant impact not only upon personnel assigned to Logistics Readiness Squadrons (LRS) CONUS-wide, but also to the bottom line maintenance costs when shelf-life items with expiration dates

are considered. It is possible that consolidation could help to relieve stressed manning levels due to the 1:1 deployment dwell experienced by most logistics personnel by allowing the LRS to reallocate those personnel to undermanned positions within the Distribution Flight. Furthermore, a former Advanced Logistics Readiness Officer Course (ALROC) student, Capt Johari J. Hemphill, wrote a paper titled "The Air Force is Losing Money Due to the Under Utilization of Shelf-Life Assets in the Mobility Bag (C-Bag)." This paper could be expanded upon through greater research into how consolidation could help to achieve cost savings with regard to shelf-life items.

- Explore the possibility of prepositioned stocks of bags at crucial locations. These could be at CONUS Aerial Ports of Embarkation (APOEs) such as Travis AFB, California, or Charleston AFB, South Carolina, or at overseas Aerial Ports of Debarkation (APODs) like Ramstein Air Base, Germany. Prepositioned assets, much like the ETDC concept, could greatly reduce transportation costs, however methods for replenishing shelf-life items would need to be explored.

APPENDIX A

TOTAL SHIPMENT COST

Total Shipment Cost

1 Bag -- 30 lbs

CMBCC to	Travis	McGuire	Lackland	Djibouti	Poland	Pakistan
Air	$178.05	$144.85	$164.70	$751.58	$751.58	$413.71
Surface	$36.75	$17.29	$26.27	$604.72	$604.72	$384.25

16 Bags -- 480 lbs

CMBCC to	Travis	McGuire	Lackland	Djibouti	Poland	Pakistan
Air	$2,962.05	$1,338.46	$2,416.51	$8,509.87	$8,509.87	$5,166.34
Surface	$1,828.11	$576.49	$1,045.94	$4,921.56	$4,921.56	$3,515.40

50 Bags -- 1500 lbs

CMBCC to	Travis	McGuire	Lackland	Djibouti	Poland	Pakistan
Air	$8,853.60	$3,987.38	$7,405.13	$24,445.05	$24,445.05	$14,842.80
Surface	$4,668.26	$1,444.92	$2,865.46	$14,126.70	$14,126.70	$10,090.50

Total cost to move bags from the CMBCC to location via specified mode

APPENDIX B

SHIPMENT COST PER POUND

1 Bag -- 30 lbs

CMBCC to	Travis	McGuire	Lackland	Djibouti	Poland	Pakistan
Air	$5.94	$4.83	$5.49	$25.05	$25.05	$13.79
Surface	$1.23	$0.58	$0.88	$20.16	$20.16	$12.81

16 Bags -- 480 lbs

CMBCC to	Travis	McGuire	Lackland	Djibouti	Poland	Pakistan
Air	$6.17	$2.79	$5.03	$17.73	$17.73	$10.76
Surface	$3.81	$1.20	$2.18	$10.25	$10.25	$7.32

50 Bags -- 1500 lbs

CMBCC to	Travis	McGuire	Lackland	Djibouti	Poland	Pakistan
Air	$5.90	$2.66	$4.94	$16.30	$16.30	$9.90
Surface	$3.11	$0.96	$1.91	$9.42	$9.42	$6.73

Cost per pound to move bag from the CMBCC to location via specified mode

APPENDIX C

SHIPMENT COST PER BAG

1 Bag -- 30 lbs

CMBCC to	Travis	McGuire	Lackland	Djibouti	Poland	Pakistan
Air	$178.05	$144.85	$164.70	$751.58	$751.58	$413.71
Surface	$36.75	$17.29	$26.27	$604.72	$604.72	$384.25

16 Bags -- 480 lbs

CMBCC to	Travis	McGuire	Lackland	Djibouti	Poland	Pakistan
Air	$185.13	$83.65	$151.03	$531.87	$531.87	$322.90
Surface	$114.26	$36.03	$65.37	$307.60	$307.60	$219.71

50 Bags -- 1500 lbs

CMBCC to	Travis	McGuire	Lackland	Djibouti	Poland	Pakistan
Air	$177.07	$79.75	$148.10	$488.90	$488.90	$296.86
Surface	$93.37	$28.90	$57.31	$282.53	$282.53	$201.81

Cost per bag to move from the CMBCC to location via specified mode

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14. ABSTRACT

This paper uses transportation costs to determine whether it makes sense to centrally locate the C-bags at one specific location, the Consolidated Mobility Bag Coordination Center (CMBCC) at Wright-Patterson AFB, Ohio, and distribute the bags from there when needed for deployments. Using cost data concerning the shipment of bags from the CMBCC to either a deployer's home station or directly to the deployed location and comparing that data to the excess baggage charges currently imposed by commercial airlines, the answer appears to be negative – that it is not more efficient, with regard to transportation costs, to distribute bags from a central facility. There are, however, many other factors to consider such as personnel manning, replenishment costs for expired items, and the proper determination of C-bag requirements, before a decision should be made.

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